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Biodiversity of the high mountain terrestrial fauna in Bulgaria

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On the relatively small territory of Bulgaria are situated entirely or in part 8 mountains with altitude over 2000 m. Rila (Mussala, 2925 m) is the highest mountain between the Alps and Caucasus. The others are Pirin (2914 m), Stara planina (2376 m), Vitosha (2290 m), Osogovska planina (2252 m), Slavyanka, or Alibotush (2212 m), Rhodopes (2191 m) and Belassitsa (2029 m). For many years we have been collecting data concerning all species of terrestrial Metazoa on these mountains in order to determine the most important elements - endemics, relicts, etc. As for no other East European country exists such analysis, we had to compare the data obtained in Bulgaria with the faunas of the Pyrenees, the Alps, Caucasus or the Himalaya.

Trying to clarify the very notion of „high mountain fauna", for the purposes of the present study we took as limit the isohyps of 1900 m, recording only the species living outside the forested areas. No glaciers exist on Bulgaria mountains, but some glaciation took place in the Pleistocene.

We are going to discuss here some of the groups of Metazoa containing hypsobionts, as well as the most remarkable species. The glacial relicts have been summarized by BURESCH & ARNDT (1926) and the boreoalpine species by BERON (1969).

Nematoda. In the papers of ANDRASSY (1958) and KATALAN-GATEVA (1968) we find data concerning 16 species of Nematoda, found above 1900 m, half of which (8) have been recorded above 2400 m (in Rila and Pirin).

Oligochaeta. Earth worms (Lumbricidae) have been observed to the top of Mussala (2925 m), but the highest species recorded is *Dendrobaena byblica* (Rosa) - Rila, „beim Smradlivo-See" - ca. 2300 m (ČERNOSVITOV, 1934). The inhabitants of the highest belts have not been studied yet.

Gastropoda terrestria. Among the terrestrial Gastropods in Bulgaria (ca. 230 spp.), 22 are known to occur above 1900 m. They belong to 9 families, the highest living (above 2500 m) are 4 sp. of Helicidae, *Pyramidula rupestris* (Drap.) from Pleurodiscidae and *Deroceras agreste transcaucasicum* (Simroth) from Limacidae. Two species of Helicidae - *Faustina (Wladislawia) polinskii* A. Wagner and *F.(W.)*

sztolcmani A. Wagner - are endemic in Pirin, reaching the summit of Vihren (2914 m). Ref.: DAMJANOV & LIKHAREV (1975), HUDEC & VAŠASTKO (1971), JAECKEL (1954), SAJO (1968), URBANSKI (1964, 1969), URBANSKI & WIKTOR (1967), WAGNER (1927).

Crustacea. Isopoda. Oniscidea. Only *Hyloniscus riparius* (C.L. Koch) and *Porcellium recurvatum* Verh. (= *witoschicum* Verh.) are known above 1900 m - the woodlice are very rare in the high mountain environment in Bulgaria. *Hyloniscus riparius* has been found at 2900 m (Pirin, Vihren). Ref.: Andreev (pers. comm.).

Arachnida. From the 7 arachnid orders in Bulgaria 3 (Palpigrada, Scorpionida and Solpugida) have never been found above 1900 m.

Pseudoscorpionida. Typical for the highest summits of Rila and Pirin is *Neobisium carcinoides* (Hermann). Ref.: REDIKORZEV (1928), Beron (pers. obs.).

Opilionida. Out of 56 harvestmen species in Bulgaria 11 are known above 1900 m. Six species reach 2400 m and only *Mitopus morio* (F.) lives to the highest tops. *Paranemastoma radewi* (Roewer) has been recorded from a pot hole on Vihren (Pirin) at ca. 2650 m, *Leiobunum rumelicum* Šilhavy and *Rafalskia olympica* (Kulcz.) - at 2700 m. Ref.: BERON & MITOV (1996), BLISS (1982), STAREGA (1976), ŠILHAVY (1965).

Araneida. Everywhere in the high mountain environment the spiders are among the most numerous, both in number and in species diversity. Among the 207 species, known in Bulgaria above 1900 m, there are 12 endemics for our country (especialy in Pirin, which is very well studied). The high altitude spiders in Bulgaria belong to 14 families. By far the most important are Linyphiidae (including Erigonidae), with 68 sp. above 1900 m. At least 18 spiders reach the summits of Rila and Pirin (above 2900 m): *Erigone pirini* Deltshev, *Diplocephalus altimontanus* Deltchev, *Scothinotylus alpigenus* (L. Koch), *Metopobactrus orbelicus* Deltchev, *Meioneta rurestris* (C.L. Koch), *Porrhomma convexum* (Westring), *Oreonetides glacialis* (L. Koch), *Lepthyphantes improbulus* Simon, *L. lithoclasicolus* Deltchev, *L. quadrimaculatus* Kul., *L. annulatus* (Kul.) (Linyphiidae), *Pardosa drenskii* Buchar, *P. mixta* (Kul.), *P. nigra* C. L. Koch (Lycosidae), *Gnaphosa muscorum* (L. Koch), *Haplodrassus signifer* (C.L. Koch) (Gnaphosidae), *Philodromus aureolus* (Cl.), *Thanatus formicarius* (Cl.) (Philodromidae). At least 64 are known to live on or over 2400 m (in Rila and Pirin), 21 live over 2700 m. Ref.: BUCHAR (1968), DELTSHEV (1980a, 1980b, 1983, 1984, 1985, 1987, 1988, 1990, 1992, 1995), DELTSHEV & BLAGOEV, 1995, 1997), DRENSKI (1913, 1921, 1936, 1940, 1942, 1943), THALER, VAN HELSDINGER & DELTSHEV (1994).

Acari. All suborders of Acariformes (Acaridida, Prostigmata and Oribatida) and Parasitiformes (Gamasida and Ixodida) in Bulgaria are represented above 1900 m, but have received little attention so far. Larval *Erythraeus bulgaromontanus* Beron has been described from the top of Mussala (2925 m). From the numerous Oribatida 45 sp. of 22 fam. are known to live above 1900 m, 7 - above 2400 m and 3 (*Anachipteria deficiens* Grandj., *Trichoribates monticola* Trg., *Niphocepheus nivalis baloghi* Travé) reach the top of Mussala. Ref.: BERON (1975, 1982, 1995),

Černy (1959), Csiszar & Jeleva (1962), Daniel (1959), Dobrev (1990), Kolebinova (1974), Koyumdjieva (1972, 1978, 1990), Kunst (1958, 1961), Mrciak (1959).

Myriapoda. All 4 classes are represented in the high mountain, but **Pauropoda** and **Symphyla** are almost unknown.

Chilopoda. Very important component of the high altitude cenoses, especially Lithobiomorpha. Some *Lithobius* species reach the highest summits. Represented are Lithobiomorpha and Geophilomorpha. Ref.: Verhoeff (1928a).

Diplopoda. Out of the total number of 108 Diplopoda species in Bulgaria 12 inhabit localities situated higher than 1900 m. At least 5 among the „alticolous" Diplopoda in Bulgaria live also at the sea level. Two of the remaining are of particular interest. At 2400 m (such altitude is found in Bulgaria only in Rila and Pirin) live 4 Diplopods: *Glomeris balcanica* Verh., *Cylindroiulus boleti* (C.L. Koch), *Leptoiulus borisi* Verh. and *Polydesmus* sp. Above this altitude is found only the blackish Diplopod *Leptoiulus borisi* - the only species of this class living under the harsh conditions of the highest 500 m of our country. Many of them live on Vihren (Pirin) up to the very summit. *Megaphyllum glossulifer* Schubart is known only from Rila between 2200 and 2400 m. Ref.: Schubart (1934), Strasser (1969, 1973),Verhoeff (1926, 1928b, 1937).

Tardigrada. Four Scutechiniscidae and 13 Macrobiotidae have been published by Iharos (1961) from the high Rila, *Echiniscus canadensis* J. Murr. and *Hypsibius oberhaeuseri* Doy being found even on the top of Mussala (2925 m).

Insecta. Most orders have representatives in the high mountain, Embioptera, Mantodea and a few others being missing. The insects (1080 sp. known at or above 1900 m, 47.2 % of all Metazoa at 1900 m and 49.7 % of the Metazoa found over 2400 m. Almost half of them (41 %) belong to Coleoptera. Above 2400 m are known 234 sp., 53,6 % of them being Coleoptera (125 sp.). Above 2700 m are known at least 65 sp. The share of Coleoptera (30 sp.) is similar (46 %).

Collembola. Not well known, but 13 sp. are recorded higher than 1900 m, 3 of them even higher then 2500 m (Onychiuridae, Entomobryidae). Ref.: Rusek (1965), Gruia (in lit.).

Odonata. Eigh species reach 1900 m. Ref.: Bešovski (1960, 1994), Marinov (1995).

Orthoptera. Higher then 1900 m have been recorded 41 sp., higher then 2400 m (in Rila and Pirin) - 8, higher then 2700 m - only 3 (one Tettigoniidae - *Anterastes serbicus* Br. -W. and 2 Acrididae - *Gomphocerus sibiricus* (L.) and the boreoalpine *Aeropedellus variegatus* Br.-W.). Interesting is also the boreoalpine *Melanoplus frigidus* (Boh.), found on Botev (Stara planina) up to 2370 m. Ref.: Bey-Bienko & Peshev (1960), Buresch & Peshev (1955, 1958), Pešev (1962, 1970, 1974, 1975, 1990), Pešev & Mařan (1963), Popov (1997), Tschorbadjiev (1939), etc.

Plecoptera. Many stoneflies live in the mountain streams, 20 species have been recorded from localities higher than 1900 m. *Isoperla buresi* Raušer is known from the top of Mussala (2924), most probably blown there by the wind. Of particular interest is *Arcynopteryx compacta* MacL. - arctic-alpine species, found as

high as the lake Ledeno ezero in Rila (2720 m). Ref.: BRAASCH (1972), BRAASCH & JOOST (1976), BURESCH (1936), KLAPÁLEK (1913), RAUŠER (1962).

Coleoptera. Together with the spiders, the beetles are predominant in Bulgarian and other high mountains (450 sp., or 41 % of all Insects above 1900 m). Four of the 22 families known above 1900 m (Carabidae, Staphylinidae, Curculionidae, Chrysomelidae) are of special interest. They contain 369 sp., or 82 % of all beetles above 1900 m. Above 2400 m are known at least 125 sp. of beetles, above 2700 m - 30 sp.

Carabidae. From more then 700 sp. known in Bulgaria 125 have been recorded above 1900 m, 50 - above 2400 m, 13 - above 2700 m;11 sp. reach the highest summits (above 2900 m): *Nebria rhilensis* Friv., *N. hybrida* Rott., *Trechus rhilensis* Kaufmann, *T. gulickai* Löbl, *T. rambouseki* Breit, *Bembidion bipunctatum nivale* Heer, *Pterostichus rhilensis* Rottb., *Calathus metallicus aeneus* Putzeys, *Amara erratica* Duft., *A. quenseli* (Schönh.), *Cymindis humeralis* (Four.). Most of them are endemic, mainly for Rila, some are „boreoalpine" species. Ref.: HIEKE & WRASE (1988) and GUÉORGUIEV & GUÉORGUIEV (1995), both containing full bibliography.

Staphylinidae. This big family contains at least 122 sp. in Bulgaria found above 1900 m and 5 found above 2700 m. All of them (*Olophrum leonhardi* Scheerp., *Deliphrosoma fratellum* Rottbg., *D. macrocephalum* (Epp.), *Plathistethus morsitans* Payk., *Ocyusa ferdinandicoburgi* Ramb.) reach the highest summits above 2900 m. All *Ophthalmoniphetodes* species in the high mountain are endemic for Rila, Pirin or Vitosha. Ref.: GUÉORGUIEV (1988), SCHEERPELTZ (1937), ZANETTI (1984), ZERCHE (1990, 1993).

Curculionidae. Well studied in Bulgaria, 81 sp. are recorded above 1900 m, 18 - above 2400 m, 5 - above 2700 m. *Otiorrhynchus lithanthracius* Boh., *O. bohemani* Stierlin, *O. joakimoffi* Apf., *O. cirrhorhynchoides* Reitter and *Alophus rhodopensis* Reitter reach the highest summits (above 2900 m). *Otiorrhynchus dubius* (Strom) is boreoalpine. Ref.: ANGELOV (1976 - contains full bibliography; 1993), BEHNE (1989), GUÉORGUIEV (1988), MAZUR (1993).

Chrysomelidae. Well studied in Bulgaria, 41 sp. known higher then 1900 m, the highest living are *Oreina speciossisima drenskii* (Gruev) (2850 m) and *Longitarsus apicalis* (Beck) (2800 m). Ref.: GRUEV & TOMOV (1984, 1986) - contain full bibliography, GRUEV (1990), WARCHALOWSKI (1974).

Heteroptera. This numerous order is well known in Bulgaria and is represented above 1900 m by no less then 101 species belonging to 18 families. The altitude of 2700 m is reached by at least 11 species of the families Miridae, Lygaeidae, Stenocephalidae, Rhopalidae and Cydnidae, all of them go also over 2900 m (Josifov, pers. comm.). Boreoalpine are *Arctocorisa carinata* (C. Sahlberg), *Salda littoralis* (L.) and *Aradus pallescens frigidus* Kiritschenko, Ref.: HEISS & JOSIFOV (1990), JACZEWSKI (1949), JOSIFOV (1957, 1958, 1959, 1960, 1964, 1990).

Homoptera. Three Psyllodea and 8 Auchenorrhyncha have been recorded above 1900 m, this being only a fraction of all Homoptera living there. Ref.: KLI-

MASZEWSKI (1965), LINDBERG (1949), BAYRYAMOVA (1972, 1983).

Hymenoptera. From 149 sp. known above 1900 m 84 belong to Ichneumonidae, but only 2 of them reach 2400 m. The Bombidae species are common in the high mountain. Fifteen species of *Bombus, Alpigenobombus, Megabombus* and *Pyrobombus* and 2 sp. of *Psithyrus* are known higher than 1900 m, some (*Bombus lucorum* L., *Pyrobombus pyrenaeus* Pérez) reaching the top of Rila (over 2900 m). Particularly interesting is the distribution of *Pyrobombus monticola hypsophilus* (Skorikov) - a relict and boreoalpine species. One wasp (*Dolichovespula norvegica* F.) has been found at 2600 m (Mussala). Ref.: ATANASSOV (1939, 1942, 1972, 1975), KOLAROV (1990), PITTIONI (1938, 1939, 1940, 1943).

The ants on the high mountains of Bulgaria (14 sp. above 1900 m and only 1 known to live above 2300 m) are nearly unknown, except on Vitosha. Champion is *Manica rubida* Latr. - up to the summit of Mussala (2925 m). Ref.: ATANASSOV (1952, 1954, 1956), ATANASSOV & DLUSSKIJ (1992), FOREL (1892).

Representatives of other Hymenoptera families (Tenthredinidae, Argidae, Mutillidae, Chrysididae, Sphecidae, Apidae) also live in the high mountains, but have not been recorded over 2200 m.

Megaloptera. One of the 3 species of this order in Bulgaria (*Sialis lutaria* L.) has been found up to 2450 m. Taking into account that larvae of *Sialis lutaria* (L.) and *S. fuliginosa* Pict. live in the glacial lakes, we can consider these insects as true alpine dwellers. Ref.: POPOV (1981).

Mecoptera. *Boreus* sp. reach 2300 m on Rila. Ref.: BURESCH (1926, 1936, 1939), POPOV (1964).

Raphidioptera. *Puncha ratzeburgi* has been found on 2740 m on Rila (occasionally blown by the wind). Ref.: POPOV (1973).

Neuroptera. Above the forest belt they are almost absent. *Hemerobius humulinus* L. (Hemerobiidae) and *Sisyra fuscata* (F.) (Sisyridae) live on Cherni vrâh (Vitosha, 2250-2270 m), *Hemerobius schedli* Hölzel has been found by us at 2740 m (Marishki Chal, Rila). Ref.: POPOV (1990a, 1990b, 1993, 1997).

Diptera. Inadequately known, the numerous Diptera in the high mountains of Bulgaria are represented by 105 sp. of 18 families. Only the Tachinids are well studied (17 sp. above 1900 m). The Culicid *Aedes pullatus* Coquillet is boreoalpine. Well represented (by 22 sp., but surely many others will follow) are also Muscidae. Ref.: CZERNY (1930), SZILADY 1934), BOŽKOV (1959), JANEV (1973), KOVATCHEV (1976), BUHR (1941), Lavtchiev (pers. comm.), GREGOR & POVOLNÝ (1959), LAUTERER (1983), BESCHOVSKI & MINKOVA (1991), TANASIJTCHUK & BESCHOVSKI (1991), BESCHOVSKI (1967, 1977, 1985), HUBENOV (1988, 1992), etc.

Trichoptera. This numerous and well studied in Bulgaria order is represented higher than 1900 m by at least 56 sp. (among the 244 sp. of caddisflies known in our country): Rhyacophilidae (11 sp.), Glossosomatidae (3), Polycentropodidae (2), Philopotamidae (4), Hydropsychidae (2), Limnephilidae (32), Uenoidae (1) and Odontoceridae (1). Special attention deserve *Asynarchus lapponicus* (Zett.) (arc-

tic - alpine) and the subspecies of *Chionophylax monteryla* Bot. with their peculiar biology. They come out from holes made in the ice of the glacial lakes of Rila. Ten species are known to reach altitude above 2500 m, 6 are endemic for the high mountains of Bulgaria (*Rhyacophila, Drusus, Chionophylax, Psilopteryx). Micropterna caesareica* Schmid has been found in some pot holes of high Pirin. Ref.: BOTOŞANEANU (1956, 1957, 1965), BOTOŞANEANU & SYKORA (1963), KLAPÁLEK (1913), KUMANSKI & MALICKY (1976), MALICKY & KUMANSKI (1975), NOVAK (1971), SZCZESNY (1970), but most of all KUMANSKI (1968-1988), including 2 volumes of Fauna Bulgarica (1985 and 1988).

Lepidoptera. One of the most important orders with at the least 114 sp. of 19 families known in Bulgaria above 1900 m. Many (at least 40) sp. are associated with altitude over 2400 m on Rila and Pirin (*Gelechia, Glyphipterix, Cnephasia, Asarta, Titanio, Pyrausta, Scoparia, Catoptria, Pyrgos, Inachis, Aglais, Boloria, Euphydryas, Cyaniris, Scopula, Scotopteryx, Isturgia, Gnophos, Glacies, Hyles, Macroglossum, Parasemia, Arctia, Autographa, Syngrapha* and especially *Erebia*). At least 21 sp. reach 2700 m. Ref.: ABADJIEV (1992, 1993, 1995), BURESCH (1919, 1936), BURESCH & TULESCHKOW (1929, 1930, 1942, 1943), DRENOWSKY (1909 - 1930), FAZEKAS (1982), GANEV (1982, 1983a, 1983b, 1984), KRZYWICKI (1981), LEHMANN (1990), NESTOROVA (1992), POPOV (1998), REBEL (1903), VARGA (1973, 1975), VARGA & RONKAY (1982), VARGA & SLIVOV (1977), ZÜLLICH (1937), etc.

Amphibia. Among the 16 sp. of Amphibia in Bulgaria 8 have been found higher than 1900 m. Only the 2 glacial relicts are considered to be true mountain dwellers: *Rana temporaria* (up to 2400 m) and *Triturus alpestris* (up to 2500 m). No amphibian species in Bulgaria has been recorded above 2400 m. Ref.: BESHKOV (1961, 1972), BEŠKOV & BERON (1964), BURESCH & ZONKOW (1941), MÜLLER (1940), VÂLKANOV (1938), D. Vesselinov, in lit.

Reptilia. Seven reptile species are known above 1900 m. The three true high mountain inhabitants (*Zootoca vivipara, Lacerta agilis bosnica* and *Vipera berus*) can reach the highest altitudes in Bulgarian mountains. Rhodopes and Pirin form the southern limit of the glacial relicts *Zootoca vivipara* and *Vipera berus*. Ref.: BESHKOV (1966, 1971, 1972), BEŠKOV & BERON (1964), BEŠKOV et al. (1967), BURESCH & ZONKOW (1932, 1933, 1934, 1941), CYRÉN (1941), MÜLLER (1940), VÂLKANOV (1938).

Aves. Above 1900 m ornithologists have recorded about 78 bird species, including 36 in the alpine and subnival regions (higher than 2400 m). Some of them have been found nesting on considerable altitude (*Anthus spinoletta* and *Phoenicurus ochruros* at 2500 m, *Prunella collaris* at 2600 m). Some 16 species have been recorded above 2700 m, 10 reach the highest summits (2900 m and more): *Gypaetus barbatus* (vanished), *Accipiter nisus, Aquila chrysaetos, Alectoris graeca, Corvus corax, Pyrrhocorax graculus, Prunella collaris, Turdus torquatus, Phoenicurus ochruros* and *Tichodroma muraria*. Selected Ref.: BALAT (1962), BAUMGART (1971), V. BOETTICHER (1919), DONTSCHEV (1958, 1961, 1970, 1974, 1990), V. JORDANS (1940), PATEV (1950), REISER (1984), RENSCH (1934), SCHARNKE & WOLF(1938), SIMEONOV (1968,

1971, 1975, 1986), SIMEONOV, MIČEV & NANKINOV (1990).

Mammalia. All terrestrial mammal orders known in Bulgaria are represented above 1900 m in Bulgaria: Insectivora, Chiroptera, Rodentia, Lagomorpha, Carnivora, Artiodactyla. One mole (*Talpa europaea*) has been found at 2800 m (Rila, Bliznatsite, V. Beshkov, pers. comm.). Bats live up to the highest summits, but only two records deserve attention: *Pipistrellus nathusii* sp. in the pot hole Vihrenska propast (Pirin, 2660 m) and *Eptesicus nilssoni*, found dead in Rila at 2000 m. Up to the highest points live also *Microtus nivalis*, *Pitymys subterraneus*, *Apodemus silvaticus*, some shrews, dormice and mice (*Sorex*, *Neomys*, *Dryomys* etc,) also reach 2200-2400 m. Hares (*Lepus capensis)* have been seen even on Mussala (2925 m). Wolfs and foxes also cross the highest ridges. We have seen the weasel (*Mustela nivalis*) at 2710 m (Ledenoto ezero, Rila). *Capreolus capreolus* and *Sus scrofa* are known up to 2300-2400 m. *Lynx lynx* (extinct by 1941) used to live even as high as 2630 m (Rila). Ref.: ATANASOV (1968), ATANASSOV & PESHEV (1963), V. BOETTICHER (1925, 1939), HANAK & HORAČEK (1986), HEINRICH (1936), MARKOV (1957), MITEV (1972), NIETHAMMER & BOHMANN (1950), PASPALEV, MARTINO & PESHEV (1953), PESHEV (1955, 1959), SPIRIDONOV & SPASSOV (1985), VOHRALIK (1985), WOLF (1940).

Species of Metazoa in Bulgaria known at or above 1900 m (in brackets - species, found at or above 2400 m - Rila and Pirin)

Nematoda -	16 (8)	Ephemeroptera -	1 (0)
Oligochaeta -	9 (0)	Plecoptera -	20 (2)
Gastropoda -	22 (8)	Thysanoptera -	7 (0)
Isopoda -	2 (1)	Coleoptera -	450 (125)
Pseudoscorpionida -	2 (1)	Strepsiptera -	1 (0)
Opilionida -	11 (7)	Megaloptera -	2 (1)
Araneida -	207 (96)	Raphidioptera -	1 (1)
Acariformes -	55 (15)	Neuroptera -	10 (1)
Parasitiformes -	34 (1)	Mecoptera -	2 (0)
Tardigrada -	17 (17)	Heteroptera -	101 (ca. 30)
Pauropoda -	1 (0)	Homoptera -	11 (1)
Symphyla -	1 (1)	Hymenoptera -	149 (10)
Chilopoda -	5 (2)	Diptera -	105 (27)
Diplopoda -	6 (4)	Siphonaptera -	10 (1)
Diplura -	1 (0)	Trichoptera -	51 (12)
Collembola -	13 (5)	Lepidoptera -	114 (40)
Thysanura -	1 (0)	Amphibia -	8 (1)
Odonata -	8 (1)	Reptilia -	7 (3)
Blattodea -	1 (0)	Aves -	78 (36)
Orthoptera -	41 (8)	Mammalia -	7 (7)

Species of Metazoa in Bulgaria known at or above 2700 m (the species reaching 2900 in, Rila and Pirin, are underlined)

NEMATODA

Rhabditida
Cephalobidae: *Cervidellus insubricus* Steiner

Tylenchida
Tylenchidae: *Tylenchus graciloides* Mic.

Dorylaimida
Dorylaimidae: *Dorylaimus simus* Andrassy, *D. similis* De Man, *D. hartingi* De Man, *Enchodelus macrodorus* (De Man)

GASTROPODA

Stylommatophora
Pleurodiscidae: *Pyramidula rupestris* (Drap.)
Helicidae: *Faustina polinskii* A. Wagner, *F. sztolcmani* A. Wagner, *F. pelia* Hesse

CRUSTACEA

Isopoda
Oniscidea
Trichoniscidae: *Hyloniscus riparius* (C.L.Koch)

ARACHNIDA

Pseudoscorpionida
Neobisiidae: *Neobisium carcinoides* (Hermann)

Opilionida
Phalangiidae: *Mitopus morio* (F.), *Leiobunum rumelicum* Šilhavy, *Rafalskya olympica* (Kulcz.)

Araneida
Zodariidae: *Zodarion pirini* Drenski
Linyphiidae: *Araeoncus clivifrons* Deltshev, *Oedothorax apicatus* (Blackw.), *Erigone pirini* Deltchev, *Diplocephalus altimontanus* Deltshev, *Diplocephalus foraminifer* (O.-P. Cambr.), *Scothinotylus alpigenus* (L. Koch), *Metopobactrus orbelicus* Deltshev, *Meioneta rurestris* (C.L. Koch), *Porrhomma convexum* (Westring), *Oreonetides glacialis* (L. Koch), *Lepthyphantes improbulus* Simon, *L. lithoclasicolus* Deltchev, *L. quadrimaculatus* Kul., *L. annulatus* (Kul.)
Lycosidae: *Pardosa albata* (L. Koch), *P. drenskii* Buchar, *P. mixta* (Kul.), *P. incerta* Nosek, *P. nigra* C.L. Koch
Agelenidae: *Tegenaria montana* Deltshev
Gnaphosidae: *Gnaphosa muscorum* (L.Koch), *Haplodrassus signifer* (C.L. Koch)
Philodromidae: *Philodromus aureolus* (Cl.), *Thanatus formicarius* (Cl.)

Acariformes
Prostigmata
Stigmaeidae: *Stigmaeus* sp. (cf. *antrodes* Berlese)
Bdellidae: *Bdella* sp. (unpubl.)
Anystidae: *Anystis* sp. (unpubl.)

Erythraeidae: *Erythraeus bulgaromontanus* Beron

Oribatida

Achipteriidae: *Anachipteria deficiens* Grandj.
Ceratozetidae: *Trichoribates monticola* (Träg.)
Niphocepheidae: *Niphocepheus nivalis baloghi* Travé
Suctobelbidae: *Suctobelba similis* Forssl.

Parasitiformes

Gamasida

Laelapidae: *Laelaps* sp. (unpubl.)
Haemogamasidae: *Haemogamasus* sp. (unpubl.)

TARDIGRADA

Heterotardigrada

Scutechiniscidae: *Echiniscus canadensis* J. Murr.

Eutardigrada

Macrobiotidae: *Hypsibius oberhaeuseri* Doy.

MYRIAPODA

Chilopoda

Lithobiomorpha

Lithobiidae: *Lithobius erythrocephalus* (C.L. Koch), *L. bulgaricus* Verh.

Diplopoda

Julida

Julidae: *Leptoiulus borisi* Verh.

INSECTA

Orthoptera

Tettigoniidae: *Anterastes serbicus* Br.-W.
Acrididae: *Melanoplus frigidus* (Boh.), *Gomphocerus sibiricus* (L.), *Aeropedellus variegatus* F.-W.

Plecoptera

Perlodidae ; *Isoperla buresi* Raušer, *Arcynopteryx compacta* McLach.

Coleoptera

Adephaga

Carabidae: *Nebria rufescens* (Ström), *N. rhilensis* Friv., *N. hybrida* Rottenberg, *Trechus rhilensis* Kaufmann, *T. gulickai* Löbl, *T. demircapicus* Moravec, *T. rambouseki* Breit, *Bembidion bipunctatum nivale* Heer, *Molops alpestris* Dejean, *Calathus metallicus aeneus* Putzeys, *Amara erratica* Duftschmid, *A. quenseli* (Schönherr), *Cymindis humeralis* (Fourcroy)
Dytiscidae: *Oreodytes davisi* Curtis

Polyphaga

Staphylinidae: *Olophrum leonhardi* Scheerp., *Deliphrosoma fratellum* Rottbg., *D. macrocephalum* (Eppelsheim), *Plathystethus morsitans* Payk., *Ocyusa ferdinandicoburgi* Ramb.
Coccinellidae: *Adonia variegata* Goeze, *Coccinella septempunctata* L.
Curculionidae: *Otiorhynchus lithanthracius* Boheman, *O. bohemani* Stierlin, *O. joakimoffi* Apfelbeck, *O. merkli* Stierlin, *O. cirrhorhynchoides* Reitter, *Alophus rhodopensis* Reitter

Elateridae: *Ctenicera cuprea* F.
Chrysomelidae: *Oreina speciossisima drenskii* (Gruev), *Longitarsus apicalis* (Beck)

Raphidioptera
Raphidiidae: *Puncha ratzeburgi* (Brauer)

Neuroptera
Hemerobiidae: *Hemerobius schedli* Hölzel

Heteroptera
Miridae: *Stenodema holsatum* (F.), *Notostria elongata* (Geoffr.), *Trigonotylus coelestialium* (Kirk.), *Montanorthops montanus* (Schill.), *Chlamydatus pulicarius* (Fall.), *Placochilus seladonius* (Fall.)
Lygaeidae: *Nysius thymi* (Wolff), *Trapezonotus desertus* Seid.
Stenocephalidae: *Dicranocephalus medius* (Muls. et Rey)
Rhopalidae: *Rhopalus parumpunctatus* (Schill.)
Cydnidae: *Canthophorus impressus* (Horv.)

Homoptera
Auchenorhyncha
Delphacidae: *Laodelphax striatellus* (Fall.)

Hymenoptera
Ichneumonidae: *Aclastus borealis* Boh.
Bombidae: *Bombus lucorum* L., *Pyrobombus pyrenaeus* (Pérez)
Formicidae: *Manica rubida* (Latr.)

Diptera (2 indet.)

Trichoptera
Limnephilidae: *Limnephilus centralis* Curtis, *Asynarchus lapponicus* (Zetterstedt)

Lepidoptera
Pyralidae: *Asarta aethiopella* (Duponchel), *T. phrygialis* (Hb.), *Catoptria biformella roesleri* Ganev, *C. majorella klimeschi* Ganev
Nymphalidae (incl. Satyridae): *Inachis io io* (L.), *Aglais urticae* (L.), *Boloria pales rilaensis* Varga, *Euphydryas cynthia drenowskyi* (Rober), *E. c. leonhardi* (Frst.), *Erebia rhodopensis* Nicholl, *E. gorge pirinica* Buresch, *E. pronoe fruhstorferi* Wrn., *E. melas leonhardi* Frh., *E. pandrose ambicolorata* Varga, *E. euryale* Esper
Hesperiidae: *Pyrgos cacaliae* (Rambur)
Geometridae: *Scotopteryx luridata* (Hufnagel), *Glacies coracina bureschi* Varga
Arctiidae: *Parasemia plantaginis interrupta* Schaw., *Arctia flavia* (Fuessly)
Noctuidae: *Syngrapha divergens rilaecacuminum* Varga et Ronkay

REPTILIA

Squamata
Lacertidae: *Zootoca vivipara* Jaquin
Viperidae: *Vipera berus* (L.)

AVES

Falconiformes
Accipitridae: (*Gypaetus barbatus* L.), *Accipiter nisus* L., *Aquila chrysaetos* (L.)

Galliformes
Phasianidae: *Alectoris graeca graeca* (Meisner)

Columbiformes
Columbidae: *Columba livia livia* Gmelin

Passeriformes
Hirundinidae: *Hirundo rupestris* Scopoli
Alaudidae: *Eremophila alpestris balcanica* (Reichenow)
Prunellidae: *Prunella collaris* (Scopoli)
Muscicapidae: *Turdus torquatus* L., *Phoenicurus ochruros* (Gmelin), *Monticola saxatilis* (L.), *Oenanthe oenanthe* (L.)
Motacillidae: *Anthus spinoletta* (L.)
Corvidae: *Corvus corax* L., *Pyrrhocorax graculus* L.
Sittidae: *Tichodroma muraria* (L.)

MAMMALIA

Insectivora
Talpidae: *Talpa europaea* L.

Lagomorpha
Leporidae: *Lepus capensis* L.

Rodentia
Muridae: *Apodemus silvaticus* (L.)
Cricetidae: *Microtus nivalis* (Martins), *M. subterraneus dacius* Miller

Carnivora
Mustelidae: *Mustela nivalis* L.

Artiodactyla
Bovidae: *Rupicapra rupicapra* (L.)

Presently at least 2293 sp. of terrestrial Metazoa are known in Bulgaria to live at or above 1900 m. The line of 2400 m (only in Rila and Pirin) is reached by at least 473 sp., 2700 m - by at least 159 sp. (the list above). The most numerous order are the beetles (Coleoptera) - 450 sp., followed by the spiders (Araneida) - 207 sp. The most numerous family is Carabidae (125 sp.), followed by Staphylinidae (122 sp.). Above 2400 m still lead Coleoptera (125 sp.) and Araneida (96 sp.) and the families Carabidae (50 sp.), Staphylinidae (27 sp.) and the spider family Linyphiidae (53 sp.) .

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Биоразнообразие на високопланинската сухоземна фауна в България

Петър БЕРОН

(Р е з ю м е)

В България има 8 планини с височина над 2000 m. По тях няма съвременни ледници. Над 1900 m са известни поне 2289 вида Metazoa. В двете най-високи планини (Рила, 2925 m, и Пирин, 2914 m) над 2400 m са известни поне 471 вида Metazoa, според приложената таблица. Над 2700 m са съобщени 159 вида Metazoa. Най-богатият на видове над 1900 m разред на Metazoa е Coleoptera (450 в.), следван от паяците - Araneida (207 в.). Най-многочислено семейство е това на бегачите (Carabidae) - 124 в., следвано от Staphylinidae (117 в.). Над 2400 m най-богати разреди остават Coleoptera (125 в.) и Araneida (64 в.), а най-многочислени семейства - Carabidae (50 в.) и Linyphiidae (53 в.). Най-богати на арктоалпийски видове са Рила и Пирин.